

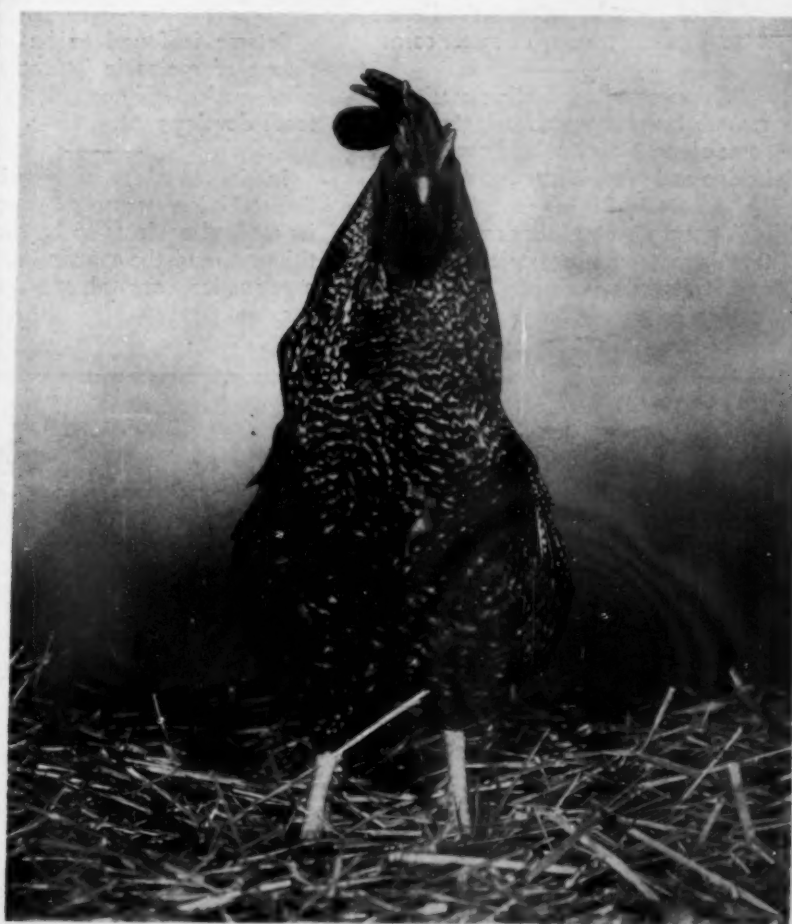
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THE WEEKLY SUMMARY OF CURRENT SCIENCE •



OCTOBER 13, 1934

Psychologists Take an Interest
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A

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Summary of Science

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DO YOU KNOW?

Census figures show cancer to be relatively common among children and young people.

Radium is one of the few imports of the United States not affected by the economic depression.

Methods of getting pine trees to yield more turpentine are being studied by Federal scientists in Florida.

There are more than 6,000 species of insects that play an important role in economics of the United States.

A tiny flea beetle has been proved guilty of spreading Stewart's disease—a troublesome malady of sweet corn.

"Ship-worms" and other marine borers are becoming increasingly troublesome along New England coast, causing bridge and pier failures.

A government poultry expert suggests that farmers can keep track of the best egg layers in a flock of hens by attaching leg bands of three colors.

It takes plant breeders 12 to 15 years to select, test, and prove a new variety of grain.

Twins occur once in about 87 births in the United States, but in Denmark the proportion is once in about 63.

The Antarctic is not always a shivery place; one explorer reported suffering from the heat in South Victoria Land in summer.

New surveys show that the Grand Teton, highest peak in the national park of that name, is 13,766 feet high, or 19 feet higher than was supposed.

Sesame is found to be one of the richest of grains in its content of calcium, which is important in bone and tooth development.

In its training of physicians, the Soviet Union prepares 75 per cent. of its medical students to be general practitioners, and the remainder, chosen by examination, are educated as specialists.

WITH THE SCIENCES THIS WEEK

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CHEMISTRY

How is heavy water made? p. 232.

CYTOLOGY

What has the bloodworm contributed to our knowledge of heredity? p. 236. *General Cytology*—Ed. by Edmund V. Cowdry—Univ. of Chicago, 1924, \$7.50.

DENDROLOGY

How can we spare the Christmas tree and enjoy it too? p. 238. *The Cultivated Conifers in North America*—L. H. Bailey—Macmillan, 1933, \$7.50.

ECOLOGY

What use has the "saksaul"? p. 233. *The Plant in Relation to Water*—N. A. Maximov—Macmillan, 1929, \$6.50.

ENTOMOLOGY

What new use have mothball crystals? p. 233.

MEDICINE

What is the American College of Surgeons doing to reduce cancer? p. 230.

ORNITHOLOGY

How does the normal rooster get up from a lying position? p. 234.

PHYSICS

How can the pattern of snowflake crystals be imitated? p. 236.

What is Dr. Millikan's explanation of the origin of cosmic rays? p. 229.

What is peculiar about the newly discovered mass thirteen isotope of nitrogen? p. 228.

What spoiled most of the stratosphere cosmic ray films? p. 233.

Where should one look for the explanation of the quality of a steel? p. 228.

PHYSICS-MEDICINE

How can medicine aid physics? p. 237.

What are the advantages of artificial radioactive substances for cancer treatment? p. 228. *The Science of Radiology*—Ed. by Otto Glasser—Charles C. Thomas, 1933, \$4.50.

PHYSIOLOGY

What is the effect of thymus treatment of rats? p. 227.

PSYCHIATRY

When can criminal behavior be prevented? p. 232.

PSYCHOLOGY

What effect has physical punishment on later tendencies to cheat? p. 233.

These curiosity arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied by Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

BIOPHYSICS

Study Electricity on Germs For New Light on Disease

Minute Electric Charges on Bacteria and Their Role
In Causing Agglutination Are Subject of Research

BY STUDYING tiny electrical charges on bacteria, so minute that they can be measured only with difficulty, medical science is learning what brings about reactions between disease organisms and the body tissues. In particular, the role of "germ electricity" in bringing about the process of agglutination, by which the body fights disease, is being made known.

Agglutination is the technical term for a clustering or clumping of bacteria under certain conditions which reduces their mobility and activity in the body.

In a report presented before the Electrochemical Society meeting, Dr. Harold A. Abramson, associate in bacteriology at Cornell Medical School, described the small electrical charges which exist on bacteria and all microscopic particles when immersed in a water solution. Such electricity is not a specific property of bacteria alone but is present also on blood cells, fungus cells, yeast cells and even such inert things as quartz dust and oil droplets when they are immersed in an aqueous solution.

It was the existence of tiny electrical charges on oil droplets, when sprayed from an atomizer, that enabled Dr. Robert A. Millikan of California Institute of Technology to measure the fundamental unit of electrical charge—the much-talked-about electron. While Dr. Millikan is now best known to the public for his researches on cosmic rays, he received his greatest award—the Nobel prize in physics—for his work on measuring the charge of the electron.

Similar Method

Dr. Abramson, using a method somewhat similar to that which Dr. Millikan employed, studies the charges on bacteria. Instead of the charged particles being in air, however, they float in a solution. Their rise and fall, under the influence of an electric field from two plates immersed in the solution, enables him to study the tiny electric charge present.

In an interview Dr. Abramson indicated that the virulent and avirulent forms of the organisms causing diphtheria can be distinguished by the electric charges they possess. Certain forms of streptococcus organisms can likewise be distinguished, and it is now possible to classify the different types of organisms which cause pneumonia by the same electrical method.

In his report to the Society, Dr. Abramson told how estimates were made, for the first time, of the amount of electricity on a typical microscopic organism like colon bacillus or typhoid bacillus. These disease organisms are so small that about 240,000,000 of them would not occupy more than a square inch. His calculations reveal that only about 300,000 electrons form the electrical charges on each organism.

While 300,000 electrons sound like a large amount of electricity, the electron is a very small unit. Every second an electric light in the home burns, it is using electrons by the millions and billions. So minute is the amount of electricity that despite the extreme small size

of the bacteria the electrical charge occupies only about one per cent. of the area.

In a study of the surface electricity of organisms Dr. Abramson found that when agglutination occurs there is still electricity present. Previously-held theories indicated that when the bacteria came together in agglutination the electric charge on the surfaces was neutralized and lost.

The study of surface electricity on bacteria is important, Dr. Abramson said, because the organisms are so small it is hard to measure anything about them. Accurate determination of the electric charge is one of the few ways they may be studied.

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PHYSIOLOGY

Thymus Gland Treatment Hastens Growth of Rats

WHAT happens if thymus gland extract is injected generation after generation is shown in the photograph of two rats, shown on this page. The little rat is 8 days old and weighs 11 grams. This is normal. The big rat is only 7 days old yet it is 37 grams in weight, over three times normal weight.

The big rat, his parents, grandparents, greatgrandparents, and other ancestors through seven generations, were treated with thymus extract by Drs. L. G. Rowntree and J. H. Clark of the Philadelphia Institute for Medical Research. The extract (*Turn to Page 238*)



CAN YOU TELL WHICH IS OLDER?

The infant rat on the left is a normal one, aged 8 days. The other is one day younger but weighs three times as much. The precocity is the result of thymus treatment.

PHYSICS—MEDICINE

Artificial Radioelements for Medicine

Discoverers of Artificial Radioactivity Now Hint At New Substance That Can be Introduced Into Body

NOTE: The articles on this and the following page were received by cable from the Science Service correspondent at the International Conference of Physics in London.

ARTIFICIAL production of radioactive elements useful in medicine and superior in intensity to radium was predicted by the famous husband-and-wife scientific team, Prof. F. Joliot and Irene Curie of Paris, who discovered artificial radioactivity less than a year ago.

Speaking before the International Conference of Physics, at London, the Joliot's expressed their hope of producing superior radioactive elements with useful properties not possessed by the radioactive substances in the development of which the famous parents of Mme. Joliot played such an important part.

These powerful radioelements that the Joliot's foresee when introduced into the living body must, they declared, behave very differently because of their chemical properties and the fact that they will disintegrate without leaving a radioactive residue.

This has great possibilities in medicine. It may mean a new kind of cancer treatment in which artificial radioactive substances produced cheaply can be introduced directly into the cancerous tissue to do their work, and then become harmless.

"Internal Materialization"

The Joliot's speculated upon just what happens within the central portion of the atom when it becomes artificially radioactive. They attributed the emission of electrons and positrons to what they called an "internal materialization" of gamma radiation, radiation of the same kind as light and X-rays. The gamma radiation, they suggest, is transformed into a positive and a negative electron in the process of leaving the central portion or nucleus of the atom which gave rise to it. In this manner neutron radiation and gamma radiation are emitted when beryllium is bombarded with the cores of helium atoms, called alpha particles, which are shot off from the naturally radioactive substance polonium.

But the Joliot's found it difficult to

imagine what happens within the atom's heart when neutrons are the bombarding particles. A possible interpretation is that the entrance of a neutron is followed by an expulsion of a negative proton, a particle that has not yet been discovered.

This expulsion of a negative proton might explain the formation of a substance heavier than any hitherto known, chemical element 93. Such an element has been reported by Prof. Enrico Fermi of Italy but doubt has been cast upon its actual existence.

Certain experiments, the Joliot's reported, suggest that neutrons bombarding phosphorus could produce radioelements themselves emitting protons.

Natural radioelements, like radium and uranium, are pronounced by the Joliot's to be apparently rare survivors of numerous elements which existed under conditions of temperature, pressure and radiation different from those existing now on earth. This must have been millions of years ago.

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PHYSICS

Study Region Where Atoms Unite to Determine Forms

PROBING into the region of the extremely minute, where atoms come together to determine the character of larger aggregations of matter, world-famous physicists attending the joint conference of the International Union of Pure and Applied Physics and the Physical Society heard Sir William Bragg keynote the inquiry:

"We must look into the region of crystals composed of atoms for explanation of the quality of a steel or bronze, a glass, a textile fiber, a living nerve and other substances. And somewhere there enters the breath of life to control atomic composition which enters into living mechanisms."

All investigations of solid bodies of every form, whether animal, vegetable or mineral, have as their primary aim, Sir William said, the connection between the properties of the body on

one hand and its composition and architecture on the other hand.

Some of these properties are directly dependent, he explained, on the few atoms and crystals of the unit cell. The arrangement of the unit cells determines the behavior of the body as a whole. Some other properties depend on the action of atomic forces in groups of hundreds, thousands or even tens of thousands of atoms.

Dr. R. A. Millikan, American physicist, presiding at the discussions upon solids, remarked that most of the knowledge of the subject has been gained by pure empiricism.

"Only in the last two or three years," Dr. Millikan said, "had the mind of man been able to get inside this body of knowledge in a theoretically satisfactory way."

It is pleasant, Sir William told the physicists, that a crystal responds to every effort to improve the accuracy of the measurements that scientists make upon it.

He called attention to the distinction made by Prof. Adolf Smekkal of Halle, Germany, between "insensitive" effects which are functions of the composition of the crystal itself and the "sensitive" effects which depend upon the crystal's treatment and previous history.

Large discrepancies have appeared in the investigations upon solids and the physicists are searching for the cause. For example, the cohesive force of rock salt calculated from the knowledge of its structure and its ionic composition is about 200 kilograms per millimeter, whereas the experimental value is usually less than a single kilogram per millimeter.

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PHYSICS

Tweedledee, Tweedledum—But One Lives Longer

THE strange fact that two varieties of a radioactive element, exactly the same in mass and in charge, have very different periods of life excited discussion at the International Conference on Physics.

One of the newly discovered artificial radioactive elements, the mass thirteen isotope of nitrogen, has different peri-

ods of decay depending upon how it is produced. Dr. J. D. Cockcroft of Cambridge's Cavendish Laboratory described the making of nitrogen thirteen both by bombarding carbons with protons and with deuterons. In both these cases the "half life period," or the time that it takes for half of the newly manufactured nitrogen to disintegrate, is ten and a half minutes. But if this nitrogen isotope is made by the method discovered by the Joliot of Paris, bombarding boron with alpha particles, it has a decay period of fourteen minutes.

"This proves that some nuclear component or condition as yet unknown

must exist," Dr. Cockcroft said in an interview.

Wide support was given in the conference for the existence of two particles of matter, the neutrino and the negative proton, which physicists have not yet discovered, although their existence has been suspected.

Experiments looking toward the use of neutrons in medicine, somewhat in the same way as radium rays and X-rays are now used, are being made by Prof. J. C. McLennan, emeritus professor of physics of Toronto University now resident in England, it was revealed at the conference.

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PHYSICS

Annihilation of Matter Seen As Cause of Cosmic Rays

MATTER being annihilated in the heated interiors of the stars and flashing "new star" novae as the origin of the cosmic rays was suggested by Dr. R. A. Millikan when he reported to the International Conference on Physics the first details of the very high altitude survey of cosmic rays made by the California Institute of Technology research team consisting of Dr. I. S. Bowen, Dr. Millikan and Dr. H. Victor Neher.

"The only source of the observed cosmic ray energies now in sight," Dr. Millikan reported, "is the annihilation of matter. But the softest components of the cosmic rays have energies corresponding to the partial annihilation or atom building hypothesis, while the energies of the hardest correspond to the complete annihilation of atoms."

Thus, in his latest interpretations, Dr. Millikan sees the cosmic rays as both the "death cries" and "birth cries" of matter. These mysterious penetrating radiations are seen as the signals of both tearing down and rebuilding of the stuff of the universe.

The process of annihilation and atom building conceivably take place, Dr. Millikan suggested, because of the ease with which hydrogen particles cluster at the extreme heat of interstellar temperature. Or they may happen because of the extremely high temperatures found in novae as suggested by Dr. Fritz Zwicky, one of Dr. Millikan's colleagues at California Institute of Technology.

Another outstanding conclusion by Dr. Millikan is that photons or radiation of the same kind as ordinary light

are responsible for most of the cosmic ray effect or ionization found at sea level or underneath the sea. This is in accord with Dr. Millikan's previous findings and is opposed to the ideas of some other cosmic ray observers.

The resistance of the atmosphere to incoming electrons, suggested by some as composing the cosmic radiation, would require energies of a billion electron volts on the basis of encounters outside the nucleus of the atoms and five billions of electron volts on account of the encounters within the nuclei of atoms, Dr. Millikan told the conference. Nuclear electron encounters were seen as producing only very soft secondaries consisting of both photons and electrons.

Dr. Millikan also reported that:

Nearly all the non-field sensitive part of the ionization of the atmosphere above sea level is due to photons of energy below 500 million electron volts.

In the equatorial belt of the earth a small part of the ionization is due to incoming secondary electrons of energies as high as ten billion volts.

(Turn to Page 231)



FOUND NEAR "FOUNTAIN OF YOUTH"

Florida's "Fountain of Youth" at St. Augustine failed to bring eternal youthfulness to these Indians of Ponce de Leon's day. But archaeologist J. R. Dickson, formerly with the University of Illinois, has found that this Indian graveyard he is unearthing contains an array of strong-framed skeletons with remarkably good teeth. The graveyard discovered recently, has revealed over 90 burials. Mr. Dickson calls them some of the earliest Christianized Indians in the United States, because many lie with arms crossed as in prayer, and because the graves lack the offerings and equipment for a future world that the prehistoric Indians placed with the dead.

MEDICINE

Organization of Surgeons Wages War on Disease

American College of Surgeons, Though Not a Teaching Institution, Does its Part to Educate the Public

By **DR. FRANKLIN H. MARTIN**,
Director-General, American College of Surgeons.

EDITOR'S NOTE: The 24th Clinical Congress of the American College of Surgeons opens in Boston on October 15, lending particular timeliness to this informative article.

WHAT is this American College of Surgeons?

The American College of Surgeons is not a teaching institution but an association of surgeons and surgical specialists of competency and of character who are engaged in a common pursuit to improve the service which they are rendering to the public; to better the hospitals and other surgical environment; to improve surgery that is necessary, and to eliminate careless and unnecessary surgery; to conduct practical research into surgical problems; and to give the public personal facts that will tend to preserve health and prolong life.

This College of Surgeons is not a political or governmental body. It is a great fraternal organization, guided by public requirements, and universal laws that have resulted from centuries of service by our greatest learned profession.

Each candidate for Fellowship in the American College of Surgeons must furnish positive evidence of preliminary primary and college training; a four or five year course in an approved medical school; a degree of Doctor of Medicine; a license to practice in his community; one to three years of training in a good hospital, or its equivalent; satisfactory assistantship in surgical service; at least seven years of medical and surgical practice; fifty to eighty per cent. of his work devoted to surgery or a surgical specialty. Above all, he must be morally, ethically, and professionally acceptable.

Must Submit Case Records

As practical evidence of his diagnostic, scientific, and professional judgment and his surgical qualifications, he must submit to the College for approval one hundred case records of surgical

operations which he himself has performed, and finally he must sign a Fellowship Pledge which declares that he does not obtain his patients by paying commissions, or through other unworthy commercial transactions.

An outstanding object of the American College of Surgeons is to emphasize the clinical aspect of surgery rather than the academic. The Fellows of the American College of Surgeons emphasize the doing of surgery rather than the talking about it.

The Clinical Congress has been called a "show me" rather than a "tell me" demonstration. It is a gathering of practical men who have come to observe the work of practical men.

Approved Hospitals

The American College of Surgeons insists upon the competency of its members and requires competency in the hospitals in which they work.

In 1916 the great hospitals of the country were taken into partnership by the College, and we have expended a total of one million dollars to achieve the goal of proper hospital care of the sick and injured. Hospitals, to secure approval, must meet a standard that has been fixed by the College.

That standard insists, as a minimum, that membership upon the staff be restricted to physicians and surgeons who are graduates of medicine in good standing and legally licensed to practice scientific medicine, who are competent in their respective fields, and worthy in character and matters of professional ethics (and under no circumstances irregulars); that the staff shall meet once a month to audit the medical and surgical work conducted in the hospital during the preceding interval; that accurate and complete case histories be written and filed so that a record of the procedures of each member of the staff may be available at all times; that modern scientific apparatus shall be provided, and that an approved clinical and pathological laboratory shall be maintained to insure facilities for correct diagnosis.

The College does not obtain its information about hospitals through correspondence, or local or general committees. Actual surveys are made by salaried employees of the College—graduates of Class A medical schools, men of maturity with an extensive training in clinical work and hospital administration. These representatives send disinterested reports of their findings to the central headquarters.

Community Cancer Clinics

The American College of Surgeons has established a standard for cancer institutes and clinics. After careful survey, approval is given to acceptable clinics where every individual may be assured of thorough birthday health examinations, and accurate diagnosis and effective treatment if he is the victim of cancer—the dread disease that now exacts an annual toll in the United States of one hundred forty thousand persons.

The College has undertaken this cancer program because it realizes that cancer, when discovered early, is curable in 48 per cent of the cases, and that without proper health supervision, of the people who are over forty years of age, one out of ten women and one out of twelve men will succumb to this dread disease.

The American College of Surgeons inaugurated its study of cancer to impress upon everyone the fact that cancer is curable by the use of the well-known and established methods of treatment that are approved by the profession of scientific medicine. In 1932 and 1933 the College reported a total of 24,448 known cancer cures of five years or more, a saving of approximately 150,000 years; and additional thousands of cancer cures of five years or more will be reported at the Boston Clinical Congress.

A recent annual report indicated that the casualties in this country, among workers in industry, numbered 19,000 killed, and 2,500,000 lost-time injuries without death. Approximately 32,500 were killed in automobile accidents, and over 1,000,000 were injured.

These appalling facts caused the American College of Surgeons to initiate its study of industrial medicine and traumatic surgery by calling a conference of outstanding lay and medical leaders in industry, in labor, in indemnity insurance, and industrial physicians and surgeons. A minimum standard was perfected and clinics which specialize in industrial medicine and traumatic surgery are under survey by the Col-

lege to determine those that are equipped to give proper service.

It is a stupendous task; but with the support of the public—employers and employees—the economic saving will amount to millions of dollars, many lives will be spared, and thousands of potential cripples will be restored to perfect health.

The American College of Surgeons has taken the leadership in a program of personal health so that the people may have the advantage of each and every discovery in the prevention of disease and in the cure of illness.

The approved hospitals, now avail-

able in every community, are urged to furnish the facilities of a diagnostic clinic to all scientific doctors in their district. The family doctor may take his patients to these Health Inventories for periodic health examinations, and there have the advantage in making his diagnosis of all up-to-date scientific apparatus and trained aids that are a part of every hospital approved by the American College of Surgeons. Thus a comprehensive audit of every patient's condition will be insured and the interests of the independent practitioner—the family doctor—will be protected.

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These are responsible for the east-west and the longitude effect found in earth's equatorial belt.

The part of the ionization that is sensitive to the earth's magnetic field increases rapidly with increasing latitude from Panama to Spokane because incoming secondaries of energies decreasing from eight to two billion get through the field's blocking effect in rapidly increasing numbers with increasing latitude, adding greatly in northern latitudes to the underlying ionization of the upper air produced by incoming photons.

Dr. Arthur H. Compton of the University of Chicago reported that there seem to be two kinds of cosmic ray bursts, an ordinary sort and a rare type about four times larger than the usual kind.

"This is very difficult to explain by any known nuclear process and the ordinary explanation would involve an element of atomic weight 1000," Dr. Compton explained.

Dr. Compton was led to this conclusion by cosmic ray measurements made this past summer in the American Rocky Mountains with Dr. G. S. Brown, Dr. H. A. Rahmel, and Prof. R. D. Bennett of Massachusetts Institute of Technology.

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Complete Huge Disc Intended For 200-Inch Telescope

THE world's largest block of glass—originally intended for the proposed 200-inch reflecting telescope of California Institute of Technology—has now been completed. Officials of the Corning Glass Works announced that the 20-ton piece of glass will be removed from the annealing ovens to make way for another twin glass disc.

Over half as wide as the average city lot and more than two feet thick, the great glass block, shaped like a slice of pineapple as it comes from the can, has served as a valuable "trial horse" for future work. Having learned by experience the problems incidental to the pouring and casting of such a large piece of glass, engineers of the glass works are now spurring work on a second disc the same size.

Would Require Grinding

The present block of glass, it is claimed, would make a satisfactory telescope mirror but a great amount of grinding would be necessary because of the unfortunate accident which occurred at the pouring last March. At that time ceramic material used to produce a honeycomb back on the disc floated to the surface and had to be removed. The present block, therefore, is solid glass throughout. It is simpler, declare the Corning scientists, to pour and cast a second disc.

It would have been extreme good fortune indeed if the first disc cast had been chosen for the 200-inch tele-

scope mirror. Astronomers recall that when the French optical firm was casting the disc for the great 100-inch mirror of the Mt. Wilson instrument, three castings were made. After tests the best one of these was chosen. It happened to be the first cast.

The pouring of the second 200-inch disc—17 feet across—should occur before the end of the year, it was announced.

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A GIANT IN GLASS

Twenty tons is the weight of the great block of glass originally intended for the new 200-inch telescope of the California Institute of Technology. Seventeen feet across and twenty-seven inches thick, the comparative size of the disc can be judged by the men standing on it. They are Dr. J. C. Hoetter, research director of the Corning Glass Works and Dr. George V. McCauley, physicist in charge of making the mirror.

CHEMISTRY

"Giant" Oxygen Molecules Found Twice Normal Size

THE existence of oxygen molecules twice as large as those found in the gaseous oxygen of the earth's atmosphere has been proved in experiments announced jointly from the physical chemistry laboratories of Cambridge University and the University of Berlin's Physical Chemistry Institute by Dr. H. Salow and Dr. W. Steiner. (*Nature*, Sept. 22).

The new kind of "giant" oxygen molecules each contain four atoms of oxygen. Normal oxygen like that which man breathes has only two atoms in its makeup.

Oxygen "giants" are not a common form of atomic existence. Few ever occur, probably, under average conditions. They correspond in atomic circles to the side-show "freaks" seen by man in circuses; for special seats of circumstances produce both circus and atom "giants."

What are the circumstances? In man the malfunctioning of the body glands may be the cause; in atoms it is overcrowding. Drs. Salow and Steiner can produce the double-sized oxygen molecules only when they pack many of them in containers and create high pressures.

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FORESTRY

"Rubber Forester's" Life Is Not an Easy Stretch

RUBBER foresters" have to be tough and resilient and able to stand a lot of knocking around, as their name might imply. Young men now receiving their education in forestry are not given particularly strong encouragement to point themselves for rubber plantation work by J. S. Barnes of the Soil Erosion Service, U. S. Department of the Interior. (*Journal of Forestry*, October.)

There are no openings in rubber forestry at present, because of the depressed condition of the industry. Even when times get better again, the number of fields will still be limited for there are only four rubber companies with plantation systems large enough to justify the employment of professional foresters.

A rubber forester must be able to "take it" in the tropics, which soon lose the glamour they have for the new-

comer, and turn into a confining monotony of the same job, the same faces day after day, the same endless need to be careful of what you eat and drink. Mr. Barnes lists no less than thirteen qualifications which the rubber forester should have, if he is to be successful in bucking the jungle, nursing his rows of trees, and keeping satisfactory track of the business details of his job.

And when he gets through with his tour of duty in the tropics, Mr. Barnes adds, he will find that some timber companies in the temperate lands have a prejudice against giving jobs to former rubber foresters. He stands the risk of coming back home only to find himself an outsider.

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CHEMISTRY

Make Heavy Water at Only One-Twentieth Former Cost

HEAVERY water can now be made at a cost one-twentieth of that produced by the conventional electrolysis method which has been used to make most of this unusual liquid.

Two German scientist-brothers, Drs. A. and L. Farkas, now research fellows at Cambridge, and Prof. E. K. Rideal, colloid chemist at Cambridge, announced their achievement to the British Association for the Advancement of Science.

A catalyst, one of the substances that promotes a chemical reaction without itself participating, is used. Hydrogen gas is bubbled through ordinary water in the presence of this catalyst. The amount of deuterium or heavy-weight hydrogen in the water is increased and the deuterium content of the hydrogen gas is correspondingly decreased.

Then the trick is to divide the water with its enhanced content of heavy hydrogen. One part is used to make hydrogen gas, which is then bubbled through the other part of the water. This process, repeated over and over, finally gives water in which most of the hydrogen atoms are double-weight.

Since the discovery that ordinary hydrogen has a twin or isotope twice its weight only a small amount of the heavy hydrogen or the heavy water made from it has been made.

G. B. B. M. Sutherland told the British scientists that heavy water should solve the troublesome question of how the molecules of water and ice are arranged.

Science News Letter, October 13, 1934

IN SCIENCE

PSYCHIATRY

Scientific Study Could Prevent Crime

IF BRUNO Richard Hauptmann had been carefully studied by a psychiatrist when he was first sent to prison years ago, he might not now be facing trial in connection with the Lindbergh kidnapping. So it appears from the teachings of modern psychiatrists who have studied crime and criminals.

The possibility of a second offense being committed by an individual after he has been released from prison can be predicted in this way, in the opinion of Dr. Alfred Gordon, psychiatrist of Philadelphia. The study on which the prediction of repetition of criminal offenses may be made takes into account the social, hereditary and economic factors in the prisoner's life and his home environment.

While many crimes could be prevented by basing the decision for or against parole or production on such a study, more fundamental efforts toward crime prevention should properly begin with children, Dr. Gordon indicated.

All children who show from infancy vicious or irregular tendencies such as stealing, lying, truancy and extreme aggression should be put down as abnormal from the very beginning, Dr. Gordon said. When these tendencies first appear is the time to take precautionary measures with regard to the child's life at home and in school, in order to prevent his becoming a criminal.

Abnormal or irregular behavior tendencies in children are largely the result of poor heredity, in Dr. Gordon's opinion. He considers poor environment and lack of sympathetic relationship on the part of neighbors and the community the next most important factors in causing criminal behavior.

For this reason, further steps toward crime prevention depend on society's giving a better chance to the abnormal child and also to the released prisoner who is really anxious to rehabilitate himself.

Science News Letter, October 13, 1934

SCIENCE FIELDS

PHYSICS

Cosmic Ray Film Saved From Flight Disaster

SOME four feet of motion picture film recording cosmic ray activity to an elevation of 40,000 feet was saved from one of three California Institute of Technology electroscopes aboard the ill-fated National Geographic-United States Army stratosphere balloon, Dr. H. Victor Neher has announced.

Undaunted by loss of film in the other two instruments, Dr. Neher and Dr. Robert A. Millikan will have one electroscope on the projected Piccard stratosphere flight.

Dr. Neher said that the rescued film has a record that agrees with results obtained a year ago on the Settle flight. Recordings obtained above 40,000 feet were spoiled by fogging. The crash cracked the film magazines of each instrument, exposing the film to daylight.

As Drs. Millikan and Neher most desired cosmic data from an electroscope sheathed with lead, the one on the Piccard ascension will be so encased.

Science News Letter, October 13, 1934

PSYCHOLOGY

Examination "Cribbers" Found Most Aggressive

LEAVING students alone in an examination room with a book of answers temptingly near on the desk, a psychologist looking through a one-way vision screen was enabled to observe personality differences between those who "cribbed" and those who scrupulously left the answers alone. The results were reported to the American Psychological Association by Dr. Donald W. MacKinnon, of Bryn Mawr College.

A few more than half (54 per cent.) of the men and women students left the answer book alone or looked only at answers at which they were told they might glance. The others all used the answer book.

The "cribbers" were, in general, the ones who got angry at the problems, who swore, pounded the table, stamped

feet, kicked the table leg, and even got up and stamped back and forth across the room.

Other, more repressed signs of nervousness were noted in those who did not look at the answers. In general these were the ones who bit finger nails, pulled at their hair, fidgeted, crossed their legs, hunched their shoulders, and so on.

Questioning later on revealed that those who admitted looking at the answers said they had no feelings of guilt about it.

Inquiries as to the punishments the students had received in their youth showed that in general the ones who peeked were the ones who had been severely punished by physical means; the others were those whose parents had selected punishment designed to make them feel "small" and socially disapproved.

Science News Letter, October 13, 1934

NAVIGATION

Stars and Sun Still Guide Ships in High Seas

THE stars guide the ships of the sea safely from port to port, much as they did in older days, despite modern improvements in sea travel, Dr. Loring B. Andrews, executive secretary of Harvard College Observatory, explained in an address upon the uses of astronomy in navigation.

Sextant, chronometer and radio are used by the officers upon the bridge in determining the location of the vessel once the shoreline drops below the horizon. Dr. Andrews stated.

"Should you ever travel the oceans of the world for the first time or in repetition of many an earlier ocean voyage," Dr. Andrews said, "look aloft at the sun in an azure sky and at the star-studded vault of night and realize that these heavenly bodies are your friends and guides; that on the bridge of your stout ship are the officers who know the ways of observing these objects and computing the vessel's whereabouts and where over the horizon lies the next port of call. Remember that in the observatories of the world astronomers night by night compile the reference data and determine the correct time so necessary to the solution of the problems of navigation."

Dr. Andrews' talk was broadcast over the network of the Columbia Broadcasting System.

Science News Letter, October 13, 1934

ECOLOGY

U.S.S.R. Scientists Compel Sand to Yield Fruit

SAND, proverbially inhospitable to plant life, is being regimented into productivity by scientists of the Repetek Sand Station, working in the desert of Kara Kum, east of the Caspian sea and north of the Persian border. Their first task, to bind the wandering, shifting sand, they have attacked with a plant known locally as "saksaul," which has long, tenacious roots. They are planting this in large quantities.

It has been found that the dunes serve as condensers of atmospheric moisture, so that at a little depth there is a supply of water sufficient to support plant life. With the use of fertilizer, it is stated, rye, wheat, barley and fodder crops can be raised without irrigation. Experiments have also been made with grapes and fruit trees.

Melons, which thrive especially well on hot, sandy soil if they can get enough moisture, have shown considerable promise, the experimenters report. In addition to the ordinary methods of cultivation, they have been experimenting with a trick in melon-growing practised by the Turcoman nomads of the region. This consists in cutting down into the stubble of the tough camel-thorn grass and planting the melon seed in the hole. The melon seedlings thus profit by a certain degree of shelter, and especially by the fact that there is always a little more moisture in the spots where the wild plant grows.

Science News Letter, October 13, 1934

ENTOMOLOGY

Mothball Crystals Useful In War on Japanese Beetle

NAPHTHALENE crystals, the stuff mothballs are made of, have been found a good means of chemical warfare against the Japanese beetle, one of the worst of the introduced insect pests along the Atlantic seaboard.

Experiments by Dr. Walter E. Fleming and Francis E. Baker of the bureau of entomology, U. S. Department of Agriculture, have shown that eggs, larvae and pupae of the beetle can be killed in suitably prepared greenhouse soil, and that when used outdoors a thousand pounds of the odorous crystals per acre of ground will discourage the females from laying their eggs, through it will not stop them from burrowing.

Science News Letter, October 13, 1934

ORNITHOLOGY

Scientists Study a Wingless Rooster

Barnyard Counterpart of the Human "Armless Wonder" Examined in Princeton's Psychology Laboratory

By DR. FRANK THONE

See Front Cover
OCCASIONALLY, a human infant is so unlucky as to be born without arms. Surviving in spite of this handicap (for the human breed is remarkably tough and adaptable) these under-equipped children grow up into "armless wonders," who compensate for their lack of the normal grasping organs by training their toes to such stunts as threading needles and pulling corks. A number of these "armless wonders" have made good livings out of their congenital misfortune by going on the vaudeville stage to exhibit their skill.

Now these human "armless wonders" have been joined by a "wingless wonder" of the barnyard—a rooster hatched without wings, which nevertheless has managed to grow to a lusty crowing adulthood. And just as the armlessness of the human specimens provides them with a career, so the winglessness of this bird has carried him into the most distinguished circles, far from the quiet Kentucky hillside where he first pipped his shell.

It is not mere curiosity-seekers in a vaudeville house who have sought this unique wingless rooster. Noted scientists in several great research laboratories, at the Smithsonian Institution, at Princeton University and elsewhere, have been glad to make his acquaintance. They have examined his anatomy, they have taken intimate interior views of him with X-rays, they have made careful studies of the effects of his winglessness on his behavior. And finally, they have provided him with a suitable harem, so that they might see whether his peculiarity will be transmitted to his progeny.

Bred in Old Kentucky

"Wingless" was hatched something over a year ago, by a hen belonging to Mrs. O'ia Deering of Rose Hill, Kentucky. Realizing his potential scientific interest, Mrs. Deering sent him, when he was about six months old, to Dr. Herbert Friedmann, curator of birds at the Smithsonian Institution in Washing-



DARES NOT JUMP

Perched on a low coop, the wingless rooster squats in terror, with staring eyes and open beak, afraid to jump down.

ton. While much interested in certain questions relating to the bird's anatomy, Dr. Friedmann felt that it would be a pity to sacrifice such a rare specimen on the dissecting table, without first making a study of the general behavior and giving him an opportunity to breed and propagate his kind.

First Recorded Survivor

Not being in a position to carry out these studies himself, Dr. Friedmann generously loaned "Wingless" to the psychological laboratory of Princeton University. Here for several months he was kept under the close scrutiny of Dr. O. H. Mowrer, a young scientist who has made a specialty of the behavior of birds, and Prof. H. S. Langfeld, director of the laboratory.

From the outset, the scientists both at the Smithsonian Institution and at the Princeton laboratories realized what a real biological prize they had. Wingless roosters are rarer than armless men. In fact, "Wingless" is the first of his kind ever to grow to adult roosterhood, at least so far as scientific records go. Chickens are sometimes hatched wing-

less, but hitherto such specimens have all died before they even shed their pinfeathers. Therefore, because of his very uniqueness, the university career of "Wingless" has been fairly strenuous.

With trained observers, "still" cameras and movie machines recording his every reaction, "Wingless" has been confronted with the kind of simple life-problems an ordinary chicken is expected to solve. He has been placed on a perch, with grain strewn on the ground to tempt him to hop off. He has been set on a rod free to roll under him if he moved. He has been permitted to hear other roosters crowing their challenges to all within earshot. When he reached a suitable age, he was given several pullets for mates. A careful scientific record has been kept of everything he did under all these circumstances.

Hypsophobiac

One of the first things noted about "Wingless," even before he entered Princeton, was his apparent fear of heights. Placed on top of an ordinary table, or other perch of the same height, he could hardly be induced to jump off,

even though he was hungry and plenty of food was in sight on the floor. Instead of jumping, he would squat down on the edge of his perch, his beak open, with every expression of alarm that can be written on a rooster's countenance. And when he finally screwed his courage to the sticking place and made the leap, he was apt to make an extraordinarily long jump, just as a scary human being, who finally forces himself to do something he is really afraid to try, will often do it at last with a convulsive super-effort.

Helpless When Down

The reason for this height-fear on the part of "Wingless" was not at first understood. It was assumed that since most fowls give a flop of their wings when they jump downward, or even fly a few feet, that the poor flightless rooster was at a loss for the other half of his jumping apparatus.

Then, after one or two unsuccessful jumps, the truth became evident. "Wingless" did not need his wings to help him get down, but to balance himself when he landed. After some of his desperate long leaps he fell sprawling on the floor, which a normal chicken does not do.

Furthermore, he could not get up again. Once on his back or side, he was as helpless as an overturned turtle. He would kick and wriggle and "hump" himself generally, but could not get his long legs under him without assistance. A normal winged fowl apparently helps itself up with a push from its wing, as a fallen man does with his arm.

Another thing that may increase the helplessness of poor "Wingless" when he is on the ground is his general "bot-

tle-shouldered" architecture. Seen from the side, he does not look greatly different from the ordinary average run-of-the-coop Plymouth Rock rooster. But a face-on view shows him quite shoulderless, sloping inward from hips to neck with the general contour of a narrow Gothic arch—just the kind of shoulderline which caricaturists like to put on their drawings of the Timid Taxpayer. A Rhine wine bottle trying to get up and stand on its bottom might have the same difficulty which the prostrate "Wingless" encounters.

"Wingless" is not only without wings and shoulders; he hasn't any white meat, either. The breast muscles of birds, which are the white meat of chickens and other fowls that fly but little, are their wing-pullers. Since he has no wings, he needs no wing muscles; hence "Wingless" has no breast. "Wingless" would be a disappointment in the pot: nothing but drumsticks, back and neck! Mrs. Deering spared herself a Sunday-dinner disappointment when she sent her wingless young rooster forth for a career in science.

Bottle-Neck Anatomy

X-ray pictures of "Wingless" carry out the general impression you get of his anatomy when you run your fingers over his bottle-neck anatomy and feel the ribs right under his skin, in the place where the white meat ought to be. The X-ray pictures show no wing-bones, no shoulder-blades. There is on one side a spike-shaped nubbin of bone where the wingjoint might be, but until his career is ended and Dr. Friedmann finally takes his remains apart with his scalpel it will not be possible to make a guess just what that fragment is sup-

posed to represent. Besides being without the bones that go with flying, "Wingless" is generally a bit lopsided, his X-ray pictures show.

But for all his freak anatomy and his helplessness about jumping from a height and getting up off his back, "Wingless" is by no means a biological failure. On a second test, with an uneasy perch that rolled under his feet, he was able to keep his balance by teetering up and down. Motion pictures show how successful he was at this kind of thing.

Sleeps on Floor

Nevertheless, in spite of his ability to maintain himself on even an uncertain perch, "Wingless" never uses one to sleep on at night. In the coop where he now lives with his hens, the perch is only three feet or some such matter above the floor. But "Wingless" always crouches in a corner to sleep, leaving his wives up there all by themselves.

And it isn't as though he could not get up there. The scientists who have charge of him say that he is capable of surprisingly high jumps. This ability is partly due, perhaps, to his light weight, partly to his powerfully developed legs. It is quite likely that if "Wingless" did try to jump to a perch he might hit it all right, but topple right on over and fall back to the floor. So he discreetly refrains from trying.

The scientists were much interested to see what "Wingless" would do when he became old enough to crow. All normal roosters of course flap their wings a few times before telling the sun that it's time to get up. But the lack of any wings to flap didn't embarrass "Wingless" a bit. He just stretches his neck out and crows when he feels like crowing.

Psychology Course Finished

"Wingless" has now finished his course in psychology at Princeton. In fact, he is not at the University at all any more. He has retired to a secluded place in the country, married several wives, and is raising families of chicks. But even in his retirement he is still the servant of science. For one of the things they want to know about him is whether his winglessness is just a chance freak of nature peculiar only to himself or whether there is a "gene" for it that will cause it to crop out in his grand-chicks.

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Science News Letter, October 13, 1934



HELPLESS

If the wingless rooster jumps from even a low perch, he is very apt to land sprawling, and then finds it impossible to get up on his feet again.

CYTOLOGY

Chromosome Structure Details Described by Russian

Moscow and American Scientists, Working Separately, Come to Conclusions That Agree in Essentials

INTIMATE details of the internal structure of chromosomes, the tiny but mighty bits of nucleus-protoplasm that determine the course of heredity, are described by Dr. Nicolai Koltzoff of the Institute of Experimental Biology, Moscow (*Science*, Oct. 5.)

Dr. Koltzoff has undoubtedly seen some of the same things that have been studied in America by Dr. Calvin B. Bridges of the Carnegie Institution of Washington and described by him during his recent stay at the Institution's laboratories at Cold Spring Harbor, N. Y. (*See SNL*, Sept. 29, 1934.) Since each man worked independently of the other and used different biological material, there are minor differences in their accounts of what they have seen; but their essential agreements, both regarding things present in the chromosomes and in their interpretations of their significance, constitute strong mutual confirmation and support.

Based on Painter's Researches

Dr. Koltzoff started, as did Dr. Bridges, with the discovery of Prof. T. S. Painter of the University of Texas (*Science*, Dec. 22, 1933; *Genetics*, vol. 19 pp. 175-188, 448-469, 1934) that the location of certain dark "bands" on the "giant" chromosomes in the salivary gland cells of yeast-fly larvae corresponded closely to the locations of the genes, or physiological units that govern the transmission of hereditary traits. Dr. Koltzoff notes in his communication to *Science* that in all genetical laboratories throughout the world this phenomenon is now being studied.

He himself became interested in the possible reason for the chromosomes in these particular cells being so large—scores of times the size of ordinary chromosomes elsewhere in the insect's body. He noted also that in many other giant cells, the nuclei which contain the chromosomes were correspondingly enlarged, and that in some of these giant nuclei there were double, quadruple and even eight times the normal chromosome numbers.

When he made an exact examination

of the "giant" chromosomes of insect larvae, he found each to consist of the equivalent of sixteen ordinary chromosomes: that is, each was made up of sixteen threads of chromosomal material, running parallel in a gradual spiral. On each thread were bead-like thickenings, which lay side by side, the larger ones together giving the appearance of transverse disks. This is essentially the same picture that Dr. Bridges had seen. Dr. Bridges had worked with chromosomes in yeast-fly larvae; Dr. Koltzoff in his present publication features the structure he found in chromosomes of the related insect *Chironomus*, familiarly known as "bloodworms."

"Genonemes" Name Proposed

For the parallel threads Dr. Koltzoff proposes the new name "genonemes," which means "gene-threads." For the thickenings he retains a term already in existence, "chromomeres." He states that in many cases "it is easy to count the number of small chromomeres not only in stained preparations but even

in living cells of *Chironomus* and in photomicrographs of living cells."

Dr. Koltzoff inclines to the belief that the genes lie not in the heavy parts of the thread, the chromomeres, or the "bands" of Prof. Painter, but in the thin places of the thread, or genoneme. But this, he adds, is only a hypothesis, based on some of his previous work.

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PHYSICS

Liquid Films Form Delicate Designs

THE delicate tree-like, fern-resembling formations shown on opposite page are not the familiar frost designs on window panes. They are formed in liquid films between two plates of glass which are slowly separated. As the distance between plates widens air rushes in and produces the black portions of the figures. The varied and beautiful designs are the work of Toshimasa Tsutsui, Japanese scientist of Tokyo.

If the liquid used is an enamel with a cellulose base, permanent patterns may be obtained. Metal plates can then be used. After separation over slight distances the volatile material in the enamel is allowed to evaporate and the fern-like design is left on the plates.

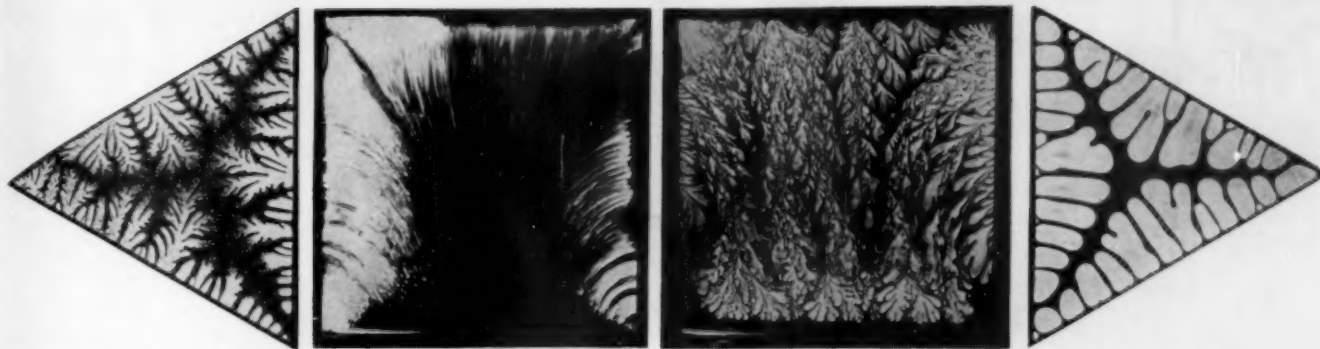
The beautiful pictures bear striking resemblance to the photomicrographs of metals although the causes of the two phenomena are quite different.

Science News Letter, October 13, 1934



PAVLOV IN HIS LABORATORY

Dr. Ivan P. Pavlov, eighty-five years old but still active in research, is here shown demonstrating an experiment to his assistants. On the occasion of his birthday, Dr. Pavlov was honored by the Soviet Government with an annual pension of 20,000 rubles (about \$17,600) and—what may make him happier—a fund of a million rubles (\$880,000) has been made available for the enlargement of the physiological laboratories at Leningrad. In addition, five scholarships have been established in his honor.



PHYSICS-MEDICINE

Hospitals Should Use Radium For Atomic Physics Research

EVERY cancer hospital a "bee-hive" of atomic research was the picture suggested by Drs. Leo Szilard and T. A. Chalmers of the physics department of St. Bartholomew's Hospital, London. (*Nature*, Sept. 29.)

Most cancer hospitals, say the doctors, have sealed containers of radium which might be used for atomic studies at times when they are not needed for therapeutic purposes. There would be no loss, or expense, in such an auxiliary use of radium products for the materials are constantly breaking up and giving off their penetrating rays. Nothing man can do will stop or reduce this self-destruction.

When radium and its disintegration products are not being used medically the powerful radiation is lost, like the energy of a waterfall that is not being harnessed.

The St. Bartholomew scientists describe new experiments demonstrating that it is possible to slip the tiny radium

containers inside packets of the light element beryllium and make the unit serve as a source of much-wanted neutrons. The gamma rays from the radium products create neutrons when they strike beryllium atoms.

Neutrons are the non-electrical units of matter as heavy as atoms of hydrogen. Their lack of electric charge means that they are able to pass easily through the electric field of ordinary atoms. Because they are so penetrating they are greatly desired for atomic collision experiments such as those producing artificial radioactive disintegration.

Current discussions at the International Union of Pure and Applied Physics in London indicate that the rays from these artificially produced radioactive substances may find uses in medicine.

Thus the suggestion of Drs. Szilard and Chalmers indicates that medicine can, perhaps, help itself by helping atomic research.

The suggestion of Drs. Szilard and Chalmers that radium vials from cancer hospitals might serve double duty for atomic research has already been applied in the United States. The neutron experiments of Drs. George B. Pegram and John R. Dunning at Columbia University were made possible by close cooperation with Dr. G. Failla, physicist of Memorial Hospital in New York City. Working at odd hours, late at night and on Sundays and holidays the containers of radium products from the hospital were rushed up to Columbia for atomic experiments. Memorial Hospital has one of the world's largest supplies of radium. The Columbia investigators were thus able to obtain a most powerful source of neutrons.

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JUST LIQUID FILMS, NOT FROST

Dendritic figures produced in liquid films between plates by Japanese scientist Toshimasa Tsutsui of Tokyo. Left to right: Design using celluloid enamel; one using glycerine; one using water as the liquid, and another one using celluloid enamel. (See article on page 236)

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Wednesday, Oct. 17, at 4:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.



On Their Own Roots

HOW FEW people really do their Christmas shopping early!

To be sure, there are always a certain number of thrifty and foresighted housewives (and their price is above rubies!) who shrewdly do a little Christmas shopping all year through. Their gift-list is always in the backs of their minds, and when they see something that would be especially appropriate for Cousin Mehitabel or Uncle Adonijah they buy it at once, be the month July or October, and store it away until the appropriate time.

You can not be quite so forethoughtful in shopping for your Christmas trees, but it should be easily possible to start looking around, when an autumnal Sunday afternoon drive in the country takes you past a nursery, for a choice little evergreen to be set in a tub of earth, so that it may have leisure to become acclimated before the deep snow flies. By doing such early Christmas-tree shopping in October, you can get the choicest of all Christmas trees, a really living tree, with its roots still on it, not

doomed to die miserably and shed its needles all over the floor before the holidays have ended.

Such a permanent Christmas tree, which can be pot-sunk in your yard and taken up for holiday use year after year, growing up with the children, really has much more of the ancient Yule symbolism about it than one that has been chopped off at the roots and must presently be thrown on the rubbish-heap and ignominiously carted off to the city dump, or burned. For to our north-European ancestors, even while they were still pagans, the use of evergreen decoration during the midwinter festival, the persistent life-color of spruce and mistletoe and holly, defiant of the death-white of the snow, was a promise that the weak, far-retreated sun would soon strengthen and begin to come back again.

When the Irish and Latin missionaries began their great drive into the still-pagan parts of Germany during the early middle ages, they wisely left many of the popular observances alone, especially when their significance blended well with the new doctrines they brought. Christianity was built around the personality of One who proclaimed himself "the resurrection and the life;" here was a native symbol ready to their hand, as the shamrock had been to St. Patrick's.

The boldest of all of them. Wynfrith or Boniface, with an ax cut down the Wotan-Oak, though he paid for it later by being himself cut down with a sword. But he never laid ax to the root of the Christmas tree.

Would it not be well if we modern "heathens" should spare, at least so far as we can, that in which even the most militant of Christians could see no harm?

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From Page 227

was developed by Dr. A. M. Hanson of Faribault, Minn.

Thymus extract given to the parents accelerates the rate of growth and development in the young rats, these investigators found. The precocity is evident in increased birth weight, earlier eruption of teeth, appearance of fur, opening of the eyes and sexual development. The acceleration accrues in succeeding generations of rats born to thymus-treated parents. Giants do not result, however; the animals just grow up much faster than normal.

Starting with a small colony in June, 1933, the investigation has now reached the seventh generation. Moving pictures of the rats, showing their precocity as compared with controls of the same age and descended from the same original colony, were shown at the meeting of the American Hospital Association in Philadelphia.

Science News Letter, October 13, 1934

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

OF SCIENCE NEWS LETTER published weekly at Baltimore, Md., for Oct. 1, 1934.
Washington
District of Columbia } ss.

Before me, a Notary Public in and for the District of Columbia aforesaid, personally appeared Watson Davis, who, having been duly sworn according to law, deposes and says that he is the Editor of the SCIENCE NEWS LETTER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Editor, Watson Davis, 21st and Constitution Ave., Washington, D. C.

2. That the owner is:
Science Service, Inc., 21st and Constitution Ave., Washington, D. C., a non-profit corporation without stock, operating as the Institution for the Popularization of Science.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

Watson Davis,
Editor.

Sworn to and subscribed before me this 18th day of Sept., 1934.

[SEAL]

Charles L. Wade.

(My commission expires March 26, 1938.)

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Economics

IF I WERE DICTATOR—Julian Huxley—*Harper*, 162 p., \$2.00. The British biologist, a grandson of Thomas Henry Huxley, imagines himself Dictator to the British people and he tells what he would do, using science as his guide. Interesting to Americans is his praise of such experiments as the Tennessee Valley Authority, the Northern Parkway out of New York City, the architecture of Los Angeles city hall, etc. Some of the tasks set by his hypothetical dictatorship would be unnecessary in America because already accomplished, but in some other respects America lags. Especially interesting are Dictator Julian's plans for utilization of expert advice of scientists, in physical, natural and social science fields, and the experimental method for the testing of social experiments that he proposes.

Science News Letter, October 13, 1934

Science—Philosophy

THE GREAT DESIGN—Ed. by Frances Mason—*Macmillan*, 324 p., \$2.50. The editor of "Creation by Evolution" here produces a symposium, participated in by such well-known men as C. Lloyd Morgan, Sir Oliver Lodge and Hans Driesch, who record their several answers to the world-old question, "Is there anything besides dead matter and blind force in the universe?" In general, the verdict favors the acceptance of the postulate of a forming and guiding Mind; though the authors may not agree wholly in matters of detail.

Science News Letter, October 13, 1934

Embryology

THE ELEMENTS OF EXPERIMENTAL EMBRYOLOGY—Julian S. Huxley and G. R. de Beer—*Cambridge Univ. Press*, 514 p., \$7. Embryology here is something more than just a grind to be gone through by not-very-enthusiastic pre-medics; it is a science self-existing, not just a rung in a ladder. The student is given a chance to see something of invertebrate embryology, to consider physiological problems of embryonic life, to try to find the answers for some of the strange results of experimental embryology.

Science News Letter, October 13, 1934

Entomology

ENTOMOLOGY, WITH SPECIAL REFERENCE TO ITS ECOLOGICAL ASPECTS—Justus Watson Folsom—*Blakiston*, 605 p., \$4. Entomology, both "pure"

and economic, has long since ceased to be just the collection and identification of insects. In both its aspects, the science must now consider the intricate relationships existing between the insects themselves, between them and the world of plants and of animals outside their own subphylum, between them and the non-living objects and forces of their environment. The success of this ecological approach to entomology is well attested by the fact that, under the revising eye of Prof. R. A. Wardle, this work now enters its fourth edition.

Science News Letter, October 13, 1934

Zoology

WILD LIFE OF OUR WORLD—Ed. by John R. Crossland and J. M. Parrish—*William Collins Sons & Co., Ltd.*, 628 p., \$2.50. A remarkable quantity of natural-history book, lavish with half-tones and colored plates, considering its moderate price. The editing was done in England, so that British animals naturally come rather to the fore; yet British naturalists were ever world-rovers, so that the book as a whole really is zoologically cosmopolitan.

Science News Letter, October 13, 1934

Dendrology

POPLARS, PRINCIPAL TREE WILLOWS AND WALNUTS OF THE ROCKY MOUNTAIN REGION—George B. Sudworth—*Govt. Print. Off.*, 111 p., 10c. With public attention strongly focussed on the development of plantings in the West, in which native species will presumably play a considerable part, this new publication of the U. S. Forest Service is especially timely.

Science News Letter, October 13, 1934

Agriculture

ACHIEVING A BALANCED AGRICULTURE—*Agr. Adjust. Adm.*, 52 p., free. Herein the men who are responsible for the Agriculture Adjustment Administration stand forth and offer justification for the faith that is in them, and for the works they have wrought. Much condensed information and many persuasive arguments are presented in the few pages of this booklet.

Science News Letter, October 13, 1934

Economics

NEW FRONTIERS—Henry A. Wallace—*Reynal and Hitchcock*, 314 p., \$2. "The Chinese are the greatest individualists on earth. They cut their forests, silted up their streams, and destroyed millions of acres of their land by erosion gullies. . . . Over large areas we are even worse than the Chinese." Secretary Wallace, with three viewpoints—scientific, economic, social—fills his newest book with trenchant onslaughts upon American self-satisfaction, backed by cold facts and colder logic, offers remedies which he is confident will work; but in the end, as always, leaves the way out for his countrymen to choose.

Science News Letter, October 13, 1934

Petroleum Geology

PROBLEMS OF PETROLEUM GEOLOGY—W. E. Wrather and F. H. Lahee, editors—*American Association of Petroleum Geologists*, 1073 p., \$6. A thick book, bulging with information and opinion supplied by 47 authors in 43 symposial papers; it will be welcomed by the professional audience to which it is addressed, and by geologists generally. It forms a sequel to another important publication by the Association: *Structure of Typical American Oil Fields*.

Science News Letter, October 13, 1934

Anthropology

THE SO-CALLED WENDS OF GERMANY AND THEIR COLONIES IN TEXAS AND AUSTRALIA—George C. Engerrand—*University of Texas*, 179 p., free. An anthropological monograph on a Slavic group which has colonized only two parts of the world—Texas and Australia. A considerable literature on these people exists in other languages than English, Prof. Engerrand points out, partly because they have been the subject of much nationalistic propaganda. In producing an English work on the subject, he has attempted, he says, to avoid the bias of prejudice. The monograph is a University of Texas Bulletin.

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